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(56) Documents Cited

GB 2086459 A
EP 0805058 A1

GB 2062733 A
EP 0178064 A2

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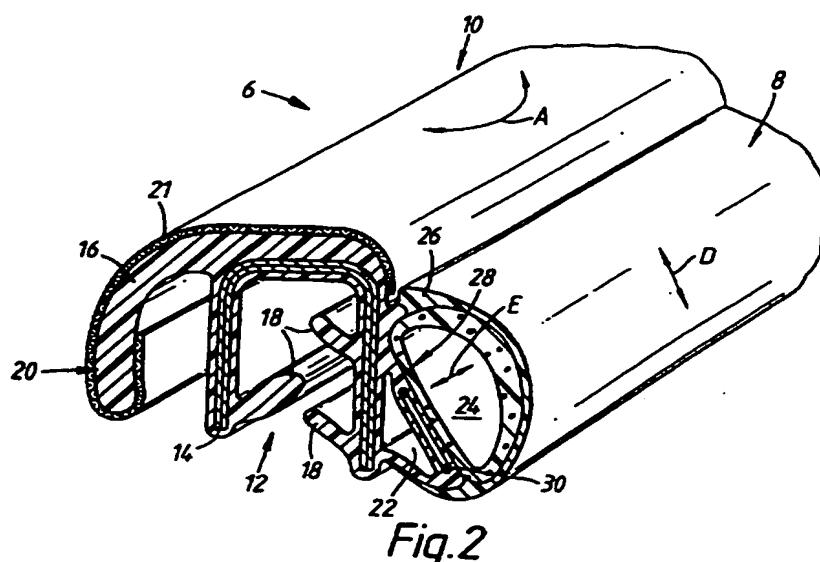
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(54) Abstract Title

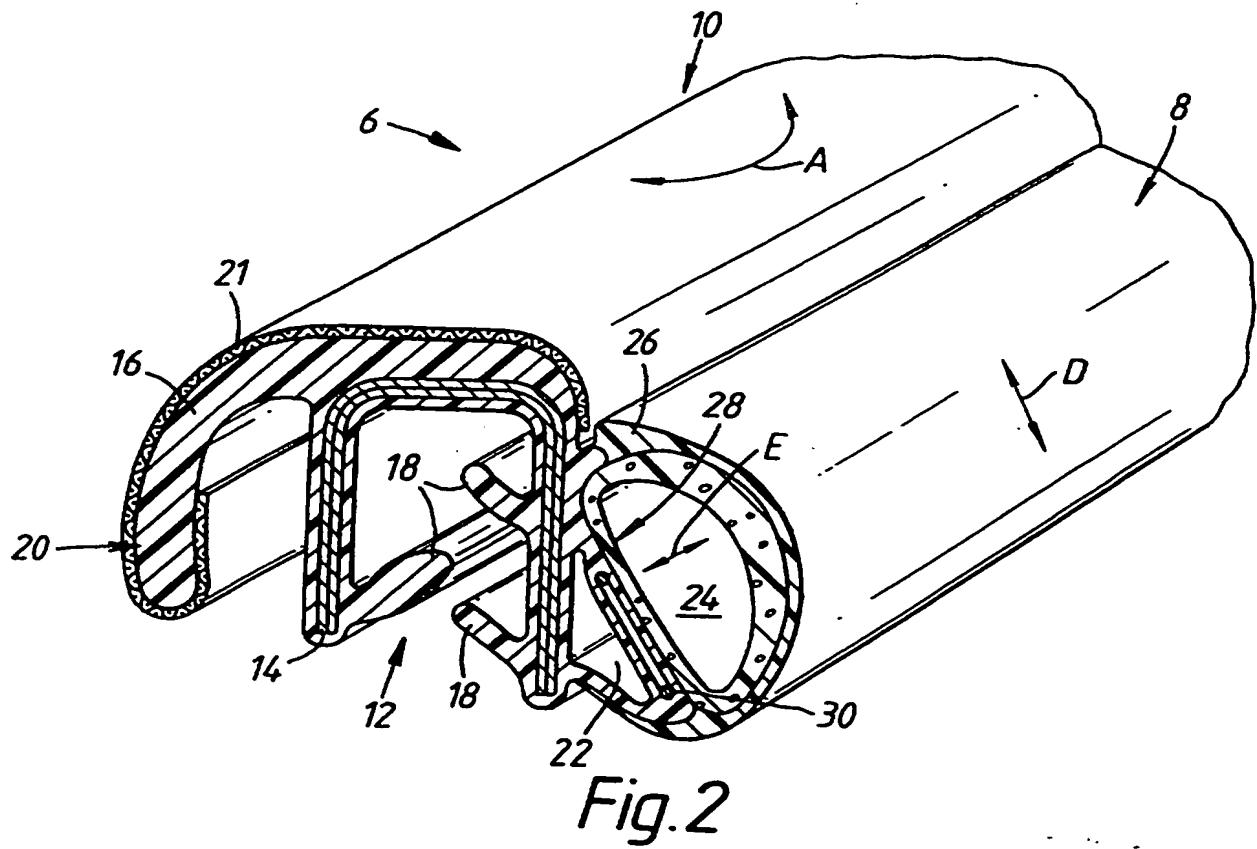
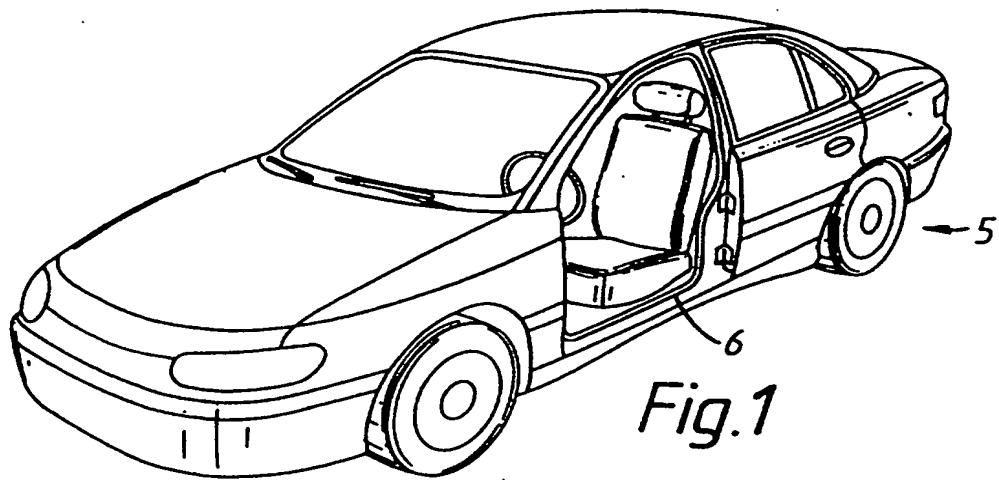
A sealing strip where the sealing member is a hollow chamber with an internal reinforcing wall

(57) A sealing strip 6, such as for a vehicle door frame, comprises a gripping part 10 or channel-shape and a tubular sealing part 8. The sealing part 8 is made of material 16 at least part of which is very soft to improve the sealing properties of the strip and to reduce weight. The hollow interior of the sealing part 8 is divided by an interior wall 28. In order to resist partial collapse or wrinkling of the sealing part 8 when the strip 6 is bent to follow a curve in the door frame, the interior wall 28 incorporates reinforcement 30 which may be metal wire or sheet. This is longitudinally compressible but stiff in the perpendicular direction.



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1

SEALING STRIPS

The invention relates to sealing strips. Sealing strips embodying the invention, and to be described in more detail below by way of example only, are for use in carrying out sealing functions in motor vehicle body construction.

According to the invention, there is provided a sealing strip, comprising a longitudinally extending sealing part defining a longitudinal hollow interior which becomes partially compressed in use to carry out a sealing function, the hollow interior having an interior wall extending across it which incorporates reinforcing material for resisting partial collapse of the hollow interior when longitudinal bending of the sealing strip occurs so as to bend the longitudinal axis which extends along the hollow interior.

Sealing strips embodying the invention, for use in carrying out sealing functions in motor vehicle bodies, will now be described, by way of example only, with reference to the accompanying diagrammatic drawings in which:

Figure 1 is a perspective view of a motor vehicle to which the

sealing strips may be fitted;

Figure 2 is a perspective view of one of the sealing strips in cross-section; and

Figure 3 is a perspective view of a reinforcement which can be used in the sealing strip of Figure 2.

Figure 1 shows a motor vehicle body 5 with one of its doors removed to show a sealing strip 6 mounted around the periphery of the door opening. In use, the closing door closes onto the sealing strip 6 to provide a weather-tight seal.

One form of the sealing strip 6 is shown in Figure 2. It comprises a sealing portion 8 and a gripping or mounting portion 10. The gripping portion 10 is in the form of a longitudinal channel 12. In use, this is embracingly clamped to the surround of the door opening. More specifically, the surround of the door opening is normally defined by a flange where the inner and outer body panels are welded together.

As shown in Figure 2, the gripping portion 10 comprises a reinforcing core or carrier 14 such as made of resilient metal

or other material, which is embedded in flexible material 16 such as rubber or plastics material. For example, the carrier 14 may be made of metal and in the form of (inverted) U-shaped elements arranged side-by-side to define the channel 12 and connected together by integral short connecting links or disconnected from each other. Other forms of carrier are, of course, possible. The carrier may be made of wire looped to and fro. The carrier 14 may be incorporated in the material 16 using a cross-head extruder. The carrier need not be made of metal. A flexible but substantially non-extensible tape may be incorporated into the material 16.

The material 16 is formed to define integral gripping lips 18 positioned on the opposite inside facing walls of the channel 12. These make contact with the opposite faces of the flange and increase the frictional gripping of the gripping portion 10. Advantageously, the material of the lips 18 is arranged to be softer than the remainder of the extruded material 16 to increase the frictional grip of the lips against the flange.

As shown in Figure 2, the material 16 is formed to define a so-called "cosmetic lip" 20. This is used to cover over, and to help to secure, the edge of a trim panel or the like inside the

vehicle body.

The gripping portion 10 may be provided with a fabric covering

The sealing portion 8 is of generally hollow tubular form and may be co-extruded with the material 16. In this example, the extruded material 16 is extended to define a first tubular part having a hollow interior of triangular form 22 in cross-section. Softer material 16A is co-extruded with the material 16 and defines a generally semi-circular hollow interior 24. The sealing portion 8 thus has a hollow interior made up of the hollow portions 22 and 24 which are separated by a wall 28 formed where the materials 16 and 16A come together.

The material 16A may be of soft open-cellular form and is covered over by a co-extruded layer 26 which may be of closed-cellular form.

However, it is not necessary for the gripping portion 8 to be co-extruded with the material 16 of the gripping portion 10. Instead, the sealing portion 8 may be made separately, by extrusion from appropriate material(s), and then secured to the gripping portion 10 by adhesive.

The covering material 26 may be coloured for cosmetic purposes.

In use, the gripping portion 10 mounts the sealing strip on the door surround, so that the sealing portion 8 extends around the door opening, on the outside of the vehicle body. The closing door thus partially compresses the sealing portion 10 which thereby provides a weather-tight seal. When mounted in this way, the mouth of the channel 12 will of course face away from the centre of the door opening.

In order to provide good sealing, it is desirable that the material 16A should be very soft and flexible. In this way, it can provide effective sealing even if there are discontinuities or variations in thickness in the flange. Soft material is also advantageous because it may be of cellular form and therefore light in weight. However, it is necessary for the sealing strip 6 to be bent to follow curves or corners in the door surround. When bent in this way, there will therefore be a tendency for the sealing portion 8 to become wrinkled at the curves or corners as the sealing strip is bent in the manner indicated by the arrows A. Arrows A show how the sealing strip bends to follow curves in the flange running around the door opening, the mouth of the channel 12 thus being on the outside of the bend. This bending

thus bends the longitudinal axis of the hollow sealing portion 8 in the same directions as arrows A. The softer is the sealing portion 8, the greater will this wrinkling tendency be.

Therefore, according to a feature of the sealing strip, a reinforcement 30 is incorporated within the wall 28. The reinforcement 30 may comprise a length of looped wire of generally zig-zag configuration. Instead, it could be a thin metal sheet as shown in Figure 3. Other forms of reinforcement are possible. The reinforcement 30 can be incorporated into the wall 28 by co-extrusion during the extrusion process. The metal sheet of Figure 3 is designed so as to be relatively compressible in the direction of the arrow B but relatively stiff in the direction of the arrow C. If wire is used for the reinforcement 31, it would be similarly arranged.

It is found that the incorporation of the reinforcement 30 considerably increases the stiffness of the sealing portion 8 in the directions of the arrow D without reducing the effective softness in the direction of the arrow E. The increased stiffness in the direction of the arrow D reduces or substantially eliminates any tendency of the sealing portion 8 to wrinkle at, or "bridge across", bends or curves in the

mounting flange. In this way, therefore, it is possible for the sealing portion 8 to be made of substantially softer material than hitherto because the increased tendency of such very soft material to wrinkle at or bridge-across bends or corners is substantially eliminated by the incorporated reinforcement 30.

CLAIMS

1. A sealing strip, comprising a longitudinally extending sealing part defining a longitudinal hollow interior which becomes partially compressed in use to carry out a sealing function, the hollow interior having an interior wall extending across it which incorporates reinforcing material for resisting partial collapse of the hollow interior when longitudinal bending of the sealing strip occurs so as to bend the longitudinal axis which extends along the hollow interior.
2. A strip according to claim 1, in which the interior wall lies in a plane which extends in the same general direction as the plane in which the bent longitudinal axis lies
3. A strip according to claim 1 or 2, in which the reinforcing material is compressible in the direction longitudinally of the strip but stiff in the perpendicular direction which lies in the plane of the wall.
4. A strip according to any preceding claim, in which the reinforcing material is looped wire.

5. A strip according to any one of claims 1 to 3, in which the reinforcing material is a metal sheet.
6. A strip according to any preceding claim, in which the sealing part is made of at least two different flexible materials.
7. A strip according to claim 6, in which the two materials respectively define parallel longitudinally extending hollow chambers arranged side by side with the two materials in contact so that the hollow chambers together define the hollow interior and the contacting materials define the interior wall.
8. A strip according to claim 7, including a third material forming a thin outer layer over the first two materials.
9. A strip according to any preceding claim, in which the sealing part is carried by a longitudinally extending mounting part for mounting the sealing part along the surround of an opening to be sealed.
10. A strip according to any one of claims 6,7 or 8, in which the sealing part is carried by a longitudinally extending

mounting part for mounting the sealing part along the surround of an opening to be sealed, the mounting part being formed of material which is integral with one of the said two materials.

11. A strip according to claim 9 or 10, in which the mounting part is channel-shaped.

12. A sealing strip, substantially as described with reference to Figure 2 of the accompanying drawings.

13. A sealing strip, substantially as described with reference to Figures 2 and 3 of the accompanying drawings.



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Claims searched: 1-13

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Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): E1J JGN

Int Cl (Ed.6): B60J 10/00, 10/08

Other: Online: World Patents Index

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
Y	GB 2086459 A	DRAFTEX DEVELOPMENT A.G.	1
Y	GB 2062733 A	MESNEL	1
Y	EP 0836962 A1	DRAFTEX DEVELOPMENT A.G.	6
X	EP 0805058 A1	DRAFTEX INDUSTRIES LTD.	1
Y	EP 0178064 A2	SCHLEGEL	1
Y	US 4448430	DRAFTEX DEVELOPMENT A.G.	1,6

X Document indicating lack of novelty or inventive step
Y Document indicating lack of inventive step if combined with one or more other documents of same category.

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P Document published on or after the declared priority date but before the filing date of this invention.
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